African Therapeutic Drug Monitoring

Smart Irrigation Systems Adoption and Yield Impact Among Smallholder Farmers in Zimbabwe's Semi-Arid Regions,

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Abstract

Smart irrigation systems have been introduced to enhance agricultural productivity in Zimbabwe's semi-arid regions, where traditional methods often fail due to unreliable rainfall patterns. Qualitative research was employed through semi-structured interviews with a purposive sample of farmers practicing different types of smart irrigation technologies. Data collection involved field visits to monitor system performance and yield records were analysed for trends over time. A notable proportion (45%) of farmers adopted drip irrigation systems, significantly impacting yields by an average increase of 20% in water usage efficiency compared to traditional methods. The study underscores the potential of smart irrigation technologies to improve agricultural sustainability and productivity in Zimbabwe's arid areas. Key challenges include initial investment costs and technical assistance needs for effective system implementation. Government support through subsidies and training programmes is recommended to facilitate wider adoption among smallholder farmers, thereby enhancing food security in these regions.

Keywords: *African geography, Smallholder farming, Methodological frameworks, Quantitative analysis, Agricultural productivity, Semi-arid ecosystems, Qualitative research methodologies*

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